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(56) Documents Cited

EP 0432836 A2 WO 94/18293 A1 US 5501815 A

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(54) **Surfactant compositions**

(57) An aqueous surfactant composition suitable, for use as a rinse-aid composition or in an aqueous, alkaline, surfactant-containing, hard-surface cleaning composition particularly suitable for use in washing ceramics or glassware to give rinse-aid performance to the cleaning composition, consists of or comprises a combination of an ether carboxylate surfactant and an alkyl polyglycoside surfactant. The use of the composition gives good head retention in beers.

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Surfactant compositions

This invention relates to surfactant compositions, to the use of such compositions as detergent rinse aids and to hard-surface cleaning or detergent compositions containing such surfactant compositions and having inherent rinse-aid properties. Without limitation thereto, the invention particularly relates to detergent compositions having inherent rinse aid properties, and to separate rinse aid compositions, each for use in the washing, especially the machine washing, of articles of glass or ceramics. The word "ceramics" is used to encompass delft and glazed earthenware and other pottery used for catering and even articles resembling ceramics, of or containing polymeric materials such as melamine, used in catering.

Particularly in the case of glass or ceramics articles used to dispense beverages or food it is important that the washed articles should dry without undue and unsightly filming or spotting as a result of the deposition of detergent residues. It is usual to use a separate rinse-aid composition in the rinse cycle of industrial size washing machines, such as those used in commercial catering establishments, and it would be of benefit if this separate addition could be minimised or avoided or if the rinse aid composition could be improved.

It is a further and separate problem that some beverages such as beers or stouts, other ales or lagers, are traditionally served with a foam "head" which is important to the marketability of the beverage. The stability or size of the head may be adversely affected by detergent or rinse aid residues on the glassware. Some beers, stouts ales or lagers are particularly susceptible to this problem and glassware used to dispense them may be insufficiently rinsed by a rinse cycle which may be considered to be generally effective to remove detergent residues. It would be of benefit to provide a cleaning composition having inherent rinse-aid properties, or to provide a separate rinse aid composition, avoiding or alleviating the problem of insufficient head-retention.

According to one aspect thereof the present invention provides an aqueous surfactant composition suitable for use as a separate rinse-aid composition, the surfactant composition being characterised in that it consists of or comprises a combination of an ether carboxylate surfactant and an alkyl polyglycoside surfactant.

According to a further aspect the present invention also provides an aqueous, alkaline, surfactant-containing, hard-surface cleaning composition particularly suitable for use in washing ceramics or glassware, the composition being characterised in that it comprises a surfactant combination, consisting of or comprising an ether carboxylate surfactant and an alkyl polyglycoside surfactant, giving inherent rinse performance properties to the composition.

The term "surfactant" is a term of art which is defined in "Surfactants", Europa Press, 3rd Edition as the contemporary name for surface active agents, the class of chemical products whose molecules are able to modify the properties of a liquid/gas or liquid/liquid interface by lowering the surface or interfacial tension, with associated changes occurring in other properties such as wetting. Those skilled in the art are in a

position to select suitable surfactants and surfactant combinations to attain the purposes of the invention.

EP 457965-A describes a textile washing composition containing an alkyl polyglycoside and an alkanol ether carboxylate together with soap in 5% to 30% by weight of the composition. The problems to which the present invention are directed do not arise and the presence of a substantial soap component would also be inappropriate in a detergent composition requiring rinse performance.

DE 4233385-A describes shampoos and shower gels for personal use based on 5% to 50% by weight of the composition of an anionic surfactant of the sulphate, sulphonate or alkyl phosphate type and containing a polyether carboxylic acid, an amine oxide and an amphoteric surfactant and, optionally, a polyglucoside. Such compositions are not relevant to the field of present invention and would not give the required rinse enhancement.

The alkyl polyglycoside surfactant component of the compositions of the invention preferably has the general formula

$$Z_n-O-R$$
 wherein

"Z" represents a reducing hexose molecule

"n" represents a number from 1 to 5 and

"R" represents an alkyl group containing up to 18 carbon atoms.

The alkyl group R is preferably a straight chain saturated or unsaturated group which may be obtained from naturally occurring fatty acids. Particularly preferably the group R contains at least 8 carbon atoms for example, suitably, from 8 to 14 carbon atoms.

It is found that the alkyl polyglucosides, in which Z in the above general formula represents a glucose molecule, are particularly effective in use for the purposes of the present invention.

The ether carboxylate surfactant component of the compositions of the invention preferably has the general formula $R'(OC_2H_4)_n'O(CH_2)_{n''}COOX$ wherein

R' represents a straight or branched chain alkyl group containing from 5 to 9 carbon atoms and preferably from 5 to 8 carbon atoms, for example from 5 to 6 carbon atoms

n' represents a number from 2 to 9, preferably from 6 to 8

n'' represents a number from 1 to 3, preferably 1

X' represents a hydrogen atom or an alkali metal atom or an alkanolamine group, for example a diethanolamine or triethanolamine group.

The combination of the alkyl polyglycoside surfactant and the ether carboxylate surfactant of the invention is preferably present in the compositions according to the invention in an effective quantity of from 2% to 20% by weight in total but particularly preferably in at least 4% by weight of the composition. The relative proportion of each of the individual surfactants preferably varies independently from about 1% to about 10% by weight for example, very suitably, from 2% to about 5% by weight of the composition.

While it is preferred that the surfactant content of the compositions of the invention consists of the surfactant combination identified above additional surfactants may be present, if this is not inconsistent in any case with the properties required of the final composition.

It is preferred that the additional surfactants, if present, be limited in total quantity to less than 10% in total by weight of the composition of the invention. As foreshadowed by the references above to published patent specifications it is preferred that the quantity of any of soap, or of sulphate, sulphonate or alkyl phosphate surfactants, if present, be less than 5%, but particularly preferably less than 2%, for example, very suitably, less than 1%. Other surfactants which are preferably absent or may be present but only in the limited

quantities indicated above are the ethoxylated nonionics and other anionics, the amphoterics or the cationics.

The aqueous cleaning compositions of the invention are essentially alkaline, for example having a pH of at least 8, suitably at least 9 and up to 14 and the ether carboxylate surfactant is particularly compatible in the context of the invention with such an environment. The required alkalinity may be achieved by the use of strong base such as caustic soda or caustic potash or other suitable material in a suitable quantity. A restricted quantity of a water-compatible organic solvent, such as a polar organic solvent, may be included either as a part of commercial surfactant or other constituents of the composition or added separately. Preferably the quantity of organic solvent is less than 10%, particularly preferably less than 5%, by weight of the composition.

The cleaning composition according to the invention preferably also contain one or more sequestrants and/or one or more dispersants. The sequestrants may be selected, for example, from suitable phosphates, phosphonates, heptonates, boroheptonates or gluconates or may be nitrilotriacetic acid (NTA) or ethylenediamine tetraacetic acid (EDTA) and may suitably be present in at least 0.5% and up to 50% by weight of the composition. The dispersants may be selected, for example, from the polyacrylates and may suitably be present in at least 0.5% and up to 5% by weight of the composition.

The cleaning compositions of the invention are particularly suitable for use in the machine washing of wares used in the catering industries and enable a separate rinse aid to be used in a reduced quantity or to be omitted. In use to wash glassware used to dispense beers, stouts, lagers or the like the compositions of the invention, either as a cleaning composition having inherent rinse properties or as a separate rinse aid, give enhanced head retention and appearance. The dosage is preferably at least 0.1% and may be up to 1.0% by volume or more.

The invention will now be illustrated by reference to the following non-limiting examples of which Example 4 is according to the invention and Examples 1 to 3 and Examples 5 and 6 are not according to the invention but are comparative therewith.

The head retention properties of the formulation according to the invention were judged by comparison with similar formulations from which both the ether carboxylate and the polyglycoside had been omitted (the base detergent) or from which the polyglycoside had been omitted or replaced by other non-ionic surfactants. The test used to judge head retention properties was as follows. A sample of beer is firstly degassed for a minimum of 12 hours. A measured amount of the degassed beer is introduced into a standardised head retention apparatus and foamed with CO₂. Head retention is expressed in terms of the time, in seconds, taken for the liquid/foam boundary to move a defined vertical distance. In the examples 5 ml of a 0.4% v/v solution of the composition of the invention or of another, comparative, composition is introduced into the degassed beer and the head retention is measured. Results within 5% of the control result, obtained with no additive, are considered to be excellent.

The base detergent, with the stated percentages being by weight unless otherwise stated, was:

55.5%	water
5.5%	47% w/w NaOH
25.0%	sodium boroheptonate (30% w/w)
2.0%	Potassium polyphosphate (50% w/w)
2.0%	Phosphinocarboxylic acid (50% w/w)
10.0%	Trisodium nitrilotriacetate (31% w/w)

Where surfactants were added these replaced corresponding quantities of water in the base formulation.

The results of the tests were as follows.

Example No.	Formulation Tested	Head Retention (secs.)
1	Control - No Detergent	75
2	Base detergent	71
3	Base + 5% w/w Akypo LF4	68
4	Base + 5% w/w Akypo LF4 and + 4.5% w/w Berol AG 6202	72
5	Base + 5% w/w Akypo LF4 and + 3% w/w Ethylan CPG 660	32
6	Base + 5% w/w Akypo LF4 and + 3% w/w Plurafac LF 404	30

Akypo LF4 is a Trademark for an ether carboxylate having a formula according to that given above as defining ether carboxylates suitable for use according to the invention.

Berol AG6202 is a Trademark for an alkyl polyglycoside having a formula according to that given above as defining alkyl polyglycosides suitable for use according to the invention.

Ethylan CPG 660 is a Trademark for a modified alcohol ethoxylate used in the art as a nonionic rinse aid additive.

Plurafac LF 404 is a Trademark for an alcohol ethoxylate also used in the art as a nonionic rinse aid additive.

In a test the formulation of Example 4 above was used to wash used beer glasses in a public house using a dosage of 0.4% v/v in place of the usual two-pack commercial separate detergent and rinse aid products. The rinse performance was found to be excellent and the head and appearance of the beers served in the washed glasses, particularly that of the lagers, which are particularly sensitive to loss of head due to detergent or rinse aid residues, were vastly improved.

Claims:

1. An aqueous surfactant composition suitable for use as a separate rinse-aid composition, the surfactant composition being characterised in that it consists of or comprises a combination of an ether carboxylate surfactant and an alkyl polyglycoside surfactant.

2. An aqueous, alkaline, surfactant-containing, hard-surface cleaning composition suitable for use in washing ceramics or glassware, the composition being characterised in that it comprises a surfactant combination, consisting of or comprising an ether carboxylate surfactant and an alkyl polyglycoside surfactant, giving enhanced rinse performance properties.

3. A composition as claimed in claim 1 or 2 wherein the alkyl polyglycoside has the general formula

$Zn-O-R$ wherein

"Z" represents a reducing hexose molecule,

"n" represents a number from 1 to 5 and

"R" represents straight or branched chain saturated or unsaturated alkyl group containing from 8 to 18 carbon atoms.

4. A composition as claimed in claim 3 wherein Z represents the glucose molecule.

5. A composition as claimed in any preceding claim wherein the ether carboxylate has the general formula

$R'(OC_2H_4)_n \cdot O(CH_2)_{n'} \cdot COOX$ wherein

R' represents a straight or branched chain alkyl group containing from 5 to 9 carbon atoms

n' represents a number from 2 to 9,

n'' represents a number from 1 to 3

X' represents a hydrogen atom or an alkali metal atom or an alkanolamine group.

6. A composition as claimed in claim 5 wherein n' represents a number from 6 to 8 and n'' the number 1.

7. A composition as claimed in any preceding claim wherein the ether carboxylate and the polyglycoside are each present in from 1% to 10% by weight of the composition.

8. A composition as claimed in claim 2 containing less than 1% of soap or of sulphate, sulphonate or alkyl phosphate surfactants.

9. A composition as claimed in claim 2 having a pH of from 8 to 14.

10. A composition as claimed in claim 1 or claim 2 and substantially as described herein.

11. The use of a composition as claimed in any preceding claim to wash or rinse glassware or ceramic articles or other hard surfaces.



Application No: GB 9613649.4
Claims searched: 1 to 11

Examiner: Michael Conlon
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Patents Act 1977
Search Report under Section 17

Databases searched:

UK Patent Office collections, including GB, EP, WO & US patent specifications, in:

UK CI (Ed.O): C5D (DHE, DHZ, DJX)

Int CI (Ed.6): C11D

Other: Online: WPI

Documents considered to be relevant:

Category	Identity of document and relevant passage	Relevant to claims
A	EP0432836 A2 (Unilever)	1,2
A	WO94/18293 A1 (Henkel)	1,2
A	US5501815 (Ecolab)	1,2

X	Document indicating lack of novelty or inventive step	A	Document indicating technological background and/or state of the art.
Y	Document indicating lack of inventive step if combined with one or more other documents of same category.	P	Document published on or after the declared priority date but before the filing date of this invention.
&	Member of the same patent family	E	Patent document published on or after, but with priority date earlier than, the filing date of this application.

